Rocky Flats Environmental Technology Site

Action Levels and Standards Framework for

Surface Water, Ground Water, and Soils

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1.0 GENERAL BACKGROUND

1.1 Goal of Action Levels and Standards Framework

A working group consisting of the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE), and Kaiser-Hill teams was formed to develop a consensus proposal for the appropriate cleanup standards and action levels that should apply to the Rocky Flats Environmental Technology Site (RFETS). This Action Levels and Standards Framework for Surface Water, Ground Water, and Soil (ALF) presents the final recommendation of the Working Group, incorporates comments from stakeholders, and is summarized in Summary Table 1. It has been developed in a manner generally consistent with the Rocky Flats Vision (Vision) and Rocky Flats Cleanup Agreement (RFCA) Preamble Objectives. In some cases, the working group found it necessary to more precisely define aspects of the objectives so that applicability of action levels and required mitigating actions could be completely defined. The goal of the ALF is to:

_ provide a basis for future decision-making;

_ define the common expectations of all parties; and

_ incorporate land- and water-use controls into Site cleanup.

Four future conceptual land uses have been determined and their approximate areal extent are delineated on the map attached

to this document as Figure 1. These land use areas include: (1) potential capped areas underlain by either waste disposal cells or contaminated materials closed in-place; (2) an industrial use area; (3) a restricted open space area; (4) another restricted open space area with low levels of plutonium contamination in surface soils; and (5) an unrestricted open space area that, while it would be managed as open space, actually could be available for any use. The capped areas on Figure 1 are proposed and will be finalized in an RFETS Closure Plan. At that time, the capped areas shown on Figure 1 not under an RFETS Closure Plan cap will be considered restricted open space.

This document describes the parties' commitments and recommendations for both action levels, cleanup levels, and standards. Action levels are numeric levels that, when exceeded, trigger an evaluation, remedial action, and/or management action. Final cleanup levels will be determined in the Corrective Action Decision (CAD)/Record of Decision (ROD). For interim remedial actions, interim cleanup levels will equal Tier I action levels unless some other ALF provision requires a greater level of cleanup (e.g., protection of surface water). This concept will be presented for public comment in a document that also includes the following:

_ resolution of the "to-be-determined" (TBD) action levels in Tables 4 and 5 in the ALF; and

_ "put-back" levels for interim soil removals.

In addition, the Parties are committed to resolve whether chemical risk and radiation dose will be evaluated and applied independently or cumulatively. The schedule for these activities will consist of a public comment period from September 1, 1996 to October 4, 1996 with a final decision by October 18, 1996.

A standard is an enforceable narrative and/or numeric restriction established by regulation and applied so as to protect one or more existing or potential future uses. Within this framework, standards are associated with surface water use classifications and applied at points of compliance (POCs). Standards are not being directly applied to ground water or soils. Closure performance standards apply to Resource Conservation and Recovery Act (RCRA) units and are explained in the RFCA.

Much of this framework is based on Maximum Contaminant Levels (MCLs). MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. The regulatory citation that lists MCLs is Title 40 Code of Federal Regulations Parts 141.61 and 141.62. Where a MCL for a particular contaminant is lacking, the residential ground water ingestion-based Preliminary Programmatic Remediation Goal (PPRG) will be used.

1.2 Programmatic Assumptions

The working group developed this framework using the following inter-related programmatic or Site-Wide assumptions:

_ The framework must be consistent with the Vision and RFCA Preamble;

_ Implementation of the framework must protect human health and the environment; and

_ Implementation of the framework must protect surface water uses and quality.

1.3 Action Prioritization and Implementation

Remedial decisions will be supportive of Intermediate and Long-Term Site Conditions as discussed in the RFCA Preamble. Protection of all surface water uses with respect to fulfillment of the Intermediate and Long-Term Site Conditions will be the basis for making soil and ground water remediation and management decisions. Actions will be designed to prevent adverse impacts to ecological resources and ground water consistent with the ALF. Because the ALF does not address the inherent value of ground water, any residual effects on ground water not addressed through this Framework will be addressed under a Natural Resources Damage Assessment (NRDA).

Actions required as a result of exceedances of the standards or action levels described in this document will be prioritized on the Environmental Restoration (ER) Ranking. The ER Ranking will, in turn, be considered in the Budget and Work Planning Process (RFCA, Part 11). These interim remedial decisions may be implemented by means of an accelerated action (Proposed Action Memorandum [PAM], Interim Measure/Interim Remedial Action [IM/IRA], or RFCA Standard Operating Protocol [RSOP]) or addressed as necessary in the CAD/ROD for the affected area. Actions will be developed in an

integrated manner with other actions being taken and will be consistent with best management practices.

1.4 Colorado Water Quality Control Commission (WQCC)

The WQCC determines water quality standards throughout Colorado. This ALF proposes several changes to the existing use classifications and standards for water at RFETS which will require approval by the WQCC. Approval of these changes by the WQCC is not guaranteed. If the WQCC does not adopt the recommendations, this Framework will be modified accordingly. The local municipalities, including-- Westminster, Broomfield, Thornton, and Northglenn-- have been and will be involved and consulted in recommendations to the WQCC.

2.0 SURFACE WATER

2.1 Basis for Standards and Action Levels

Some of the surface water quality standards and action levels proposed in this section differ from the existing state water quality standards. It will be necessary, therefore, to petition the WQCC for these changes. Petitions must provide sufficient rationale and justification to document that all water uses presented in the Vision will be protected, and will be supported by all parties. Once these changes to the water quality standards have been made, EPA will issue a new National Pollutant Discharge Elimination System (NPDES) permit within six months of WQCC action. Local municipalities will be involved and consulted in surface water decisions.

Surface water exists in Areas 2, 3, and 4 on Figure 1, as well as immediately off-site. The standards, action levels, and POCs are based on the following refinement of land uses (assuming current pond water transfer configurations):

_ Area 2 (restricted open space) will include all surface water down to, and including, the terminal ponds (Ponds A-4 and B-5) in Walnut Creek. For Woman Creek, only Pond C-2 is in Area 2. Therefore, the surface water in Area 2 is consistent with Segment 5 of Big Dry Creek.

_ Areas 3 and 4 (unrestricted open space and restricted open space due to low levels of surficial plutonium contamination, respectively) will include the streams from the terminal ponds to the plant boundary in Walnut Creek and all of Woman Creek except Pond C-2. The surface water in Areas 3 and 4 is part of Segment 4a/4b of Big Dry Creek.

2.2 Numeric Levels During Active Remediation (Near-Term Site Condition)

During the period of active remediation, the Table 1 values will apply as standards in Segment 4a/4b of Big Dry Creek and as action levels in Segment 5. This surface water framework reflects the current classifications set by the WQCC. Any future changes to the classifications made by the WQCC will be incorporated into this document.

A. Non-radionuclides

1. The numeric values that will apply throughout both stream segments are based on surface water use classifications consistent with the uses described in the RFCA Preamble are as follows:

_ Water Supply;

_ Aquatic Life - Warm 2;

_ Recreation 2; and

_ Agricultural.

2. Numeric values will be derived from the following:

a. For metals, the lower of either the aquatic life values listed in Table 3 of the Basic Standards and Methodologies for Surface Water or the Segment-Specific Water Quality Standards Apply.

b. For inorganics, the Segment-Specific Water Quality Standards apply, except for nitrate which will equal 100 milligrams/liter (mg/L) (agricultural use value).

c. Any contamination in surface water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include surface water containing nitrates that has been impacted by the Solar Ponds ground water plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner. The parties recognize that changes in the management of nitrates may cause the surface water to more routinely approach the current 10 mg/L standard at the POC.

d. Due to detention and batch release operations of Pond A-4 and Pond B-5 waters, exceedance of the numerical pH of 9.00 occurs. Both the wastewater treatment plant effluent and storm water inflows to the ponds have pH values within the numerical range of 6.5 to 9.00 prior to detention in Pond B-5 and A-4; however, the nutrient loading to the ponds promotes algae growth which can shift carbonate equilibria. These conditions cause pH exceedance above 9.00 (with a calculated 85th percentile value of 9.10). All parties agree that aquatic use is likely not impacted by pH exceedances; however, the DOE should strive to control pH in the pond waters through prudent pond water managment.

e. For organic chemicals, the following applies:

_ In Segment 4a/4b, water quality standards will apply in accordance with the use classifications identified in 2.2.A.1 above; and

_ In Segment 5, the organic chemical MCLs (or corresponding PPRGs) will apply as action levels (Table 1). Therefore, the underlying Segment 5 organic standards will not apply during the period of active remediation.

3. Temporary modifications to the numeric values during active remediation may be developed through subsequent working group efforts.

a. The basis for proposing the temporary modifications may include one or more of the following:

_ A determination of ambient conditions in a manner similar to the existing Segment 5 temporary modifications;

_ A mass-balance equation that calculates maximum influent concentrations in Segment 5 that will be protective of numeric values at Segment 4a/4b POCs without allowing treatment within waters of the State; and

_ Some other methodology agreed to by all parties.

b. These temporary modifications should be developed together with other stakeholders (i.e., the local municipalities that are impacted by surface water from the RFETS).

B. Radionuclides

1. Numeric values for plutonium and americium are risk-based (10-6 increased carcinogenic risks to human health from direct exposure including consumption).

2. Both radionuclides will be analyzed separately, and compared to the numeric value below:

_ 0.15 pCi/L for plutonium and

_ 0.15 pCi/L for americium.

There is no total pCi/L limit.

3. The parties agree that in the unlikely event that the plutonium and americium numerical standards are exceeded, the DOE will make every effort to identify the source of the exceedance. This will include documenting: hydrologic characteristics;

preventive actions, terminal pond operational parameters; and any abnormal conditions and occurrences. Further, specific decisions regarding the terminal pond operations and the release of water will be guided by the Pond Operations Plan. This plan includes specific responses for identified circumstances and preserves dam safety. DOE shall have the burden to demonstrate prudent pond water managment and strive to maintain the lowest detained volume practicable in the terminal ponds.

4. Numeric values for other radionuclides will be the site-specific standards found in Table 2 of 5 CCR 1002-8, _3.8.0. The parties will re-examine these values based upon conditions in the basins and will propose alternative values if appropriate.

C. POCs/Action Level Measuring Points

1. In Segment 4a/4b, POCs will be placed at the existing sampling locations for the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. Additional POCs for plutonium, americium, and tritium will be established near where Indiana Street crosses Walnut and Woman Creeks. In the event that exceedances simultaneously occur for either plutonium, americium, and tritium at both the Indiana Street POC and the associated Terminal Pond POC, then this occurrence will be treated as a single enforcement action. As conditions at the RFETS change, the locations of the POCs may need to change. Such changes can be made by agreement of the Parties pursuant to Part 9 of RFCA.

2. In Segment 5, exceedance of action levels will be measured in the ponds and upstream in the main stream channel at existing gaging/sampling stations or at additional sampling locations in the main stream channel as necessary.

3. Compliance will be measured using a 30-day moving average for those contaminants for which this is appropriate. When necessary to protect a particular use, acute and chronic levels will be measured differently as described in the current Integrated Monitoring Plan.

2.3 Numeric Levels After Active Remediation (Intermediate and Long-Term Site Condition)

When the Intermediate Site Condition is achieved following completion of active remediation, the surface water must be of sufficient quality to support any surface water use classification in both Segments 4a/4b and 5. All final remedies must be designed to protect surface water for any use as measured at the nearest and/or most directly impacted surface water in Segments 4a/4b and 5. Interim remedies will be consistent with this as a goal. Any temporary modifications will be removed. POCs will be at the outfalls of the terminal ponds and near where Indiana Street crosses both Walnut and Woman Creeks. If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider ground water in stream alluvium.

2.4 Action Determinations

A. When contaminant concentrations exceed the Table 1 standards at a POC, source evaluation and mitigating action will be required. Specific remedial actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. In the case of standards are exceeded at a POC, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation.

B. During active remediation, when contaminant concentrations in Segment 5 exceed the Table 1 action levels, source evaluation will be required. If mitigating action is appropriate, the specific actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. In the case of action level exceedances in Segment 5, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and

mitigating action (if appropriate) have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation.

C. Exceedances of water quality standards at a POC may be subject to civil penalties under sections 109 and 310(c) of CERCLA. In addition, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions as described in paragraph 2.4.A, above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

D. Exceedances of action levels in Segment 5 shall not be subject to civil penalties. However, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions (if appropriate) as described in paragraph 2.4.B above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

2.5 Surface Water Monitoring Network

A. Surface water monitoring will continue as currently established unless subsequent changes are agreed to by all parties. Surface water monitoring will be consistent with the Integrated Monitoring Plan which will be reviewed and revised on an annual basis.

B. All parties will receive quarterly surface water monitoring reports which will highlight any exceedances of surface water standards or action levels and any significant changes to surface water flow conditions.

3.0 GROUND WATER

3.1 Basis of Action Levels

During the period of active remediation, ground water action levels will apply and must be protective of surface water standards and quality as well as the ecological resources. Domestic use of ground water at RFETS will be prevented through institutional controls. Since no other human exposure to on-site ground water is foreseen, ground water action levels are based on surface water and ecological protection. This framework for ground water action levels assumes that all contaminated ground water emerges to surface water before leaving the RFETS.

3.2 Action Level Strategy

The strategy for ground water is intended to prevent contamination of surface water by applying MCLs as ground water action levels. Where a MCL for a particular contaminant is lacking, the residential ground water ingestion-based PPRG value will apply. Ground water action levels are based on a two-tier approach, Tier I action levels consist of near-source action levels for accelerated cleanups, and Tier II are action levels which are protective of surface water.

A. Tier I

1. Action levels consist of 100 x MCLs (see Table 2).

2. Designed to identify high concentration ground water "sources" that should be addressed through an accelerated action.

B. Tier II

1. Action levels consist of MCLs (see Table 2).

2. Designed to prevent surface water from exceeding surface water standards/action levels by triggering ground water management actions when necessary.

3. Situations where ground water is contaminating or could contaminate surface water at levels above surface water standards/action levels will trigger a Tier II action.

4. Tier II Action Levels are to be measured in designated wells.

a. Tier II wells have been selected by all parties from the existing monitoring network where practical. New wells have been proposed where apparent gaps exist. Designated Tier II wells are listed in Table 3.

b. Tier II wells are either currently uncontaminated or contaminated at levels less than MCLs. In general, Tier II wells are located between the downgradient edge of each plume and the surface water towards which the plume is most directly migrating.

c. If the proposed new wells are shown to be contaminated or if additional plume information dictates, new or alternate wells will need to be chosen.

3.3 Action Determinations

A. Tier I

1. If Tier 1 action levels are exceeded, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. If this evaluation determines that action is necessary, the type and location of the action will be delineated and implemented as an accelerated action. This evaluation may include a trend analysis based on existing data. Accelerated action priority will be given to plumes showing no significant decreasing trend in ground water contaminant concentrations over 2 years.

2. Where background levels exceed action levels, more frequent sampling and remedial actions will not be triggered. For those constituents where high background levels exist, a modified action level considering background will be developed.

3. Additional ground water that does not exceed the Tier I action levels may still need to be remediated or managed through accelerated actions or RODs to protect surface water quality or ecological resources and/or prevent action level exceedances at Tier II wells (e.g., lower-level, but fast-moving contamination). The plume areas to be remediated and the cleanup levels or management techniques utilized will be determined on a case-by-case basis.

B. Tier II

1. If concentrations in a Tier II well exceed MCLs during a regular sampling event, as specified in the Integrated Monitoring Plan, monthly sampling in that well will be required. Three consecutive monthly samples showing contaminant concentrations greater than MCLs will trigger an evaluation. This will require a ground water remedial action, if modelling, which considers mass balancing and flux calculations and multiple source contributions, predicts that surface water action levels will be exceeded in surface water. These actions will be determined on a case-by-case basis and will be designed to treat, contain, manage, or mitigate the contaminant plume. Such actions will be incorporated into the ER Ranking in which they will be given weight according to measured or predicted impacts to surface water.

2. Ground water contaminated at levels above ground water action levels currently exists at several locations. Each of these situations will be addressed according to appropriate decision documents.

3. Any contamination in ground water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include ground water containing nitrates from the Solar Ponds plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner.

C. Other Considerations

1. Efficient, cost-effective, and feasible actions that are taken to remediate or manage contaminated ground water may not necessarily be taken at the leading edge of plumes, but rather at a location within the plume. Factors contributing to this situation could include technical impracticability at the plume edge, topographic or ecologic problems at the plume edge, etc. This situation may result in a portion of a plume that will not be remediated or managed. This plume portion may cause exceedance of MCLs at Tier II wells or exceedance of surface water standards/action levels. When an up-gradient ground water action is taken that results in this situation, DOE and its subcontractor may request relief from the ground water and/or surface water standards. CDPHE and EPA will evaluate the request and may grant temporary relief or alternate concentration limits for a specific area. Soil or subsurface soil source removals will not be considered as the sole justification for alternate concentration limits. In addition, alternate concentration limits will be determined such that surface water use classifications

are not jeopardized and surface water quality does not exceed standards at POCs.

2. Ground water plumes that can be shown to be stationary and do not therefore present a risk to surface water, regardless of their contaminant levels, will not require remediation or management. They will require continued monitoring to demonstrate that they remain stationary.

3.4 Ground Water Monitoring Network

A. Ground water monitoring will be consistent with the Integrated Monitoring Plan which will be reviewed on an annual basis.

B. All ground water monitoring data as well as changes in hydrologic conditions and exceedances of ground water standards will be reported quarterly and summarized annually to all parties.

C. If quarterly reporting shows that previously uncontaminated wells are contaminated above ground water standards, the sampling frequency will be increased to monthly. Three consecutive monthly samples showing exceedances will trigger an evaluation to determine if a remedial or management action is necessary. If three consecutive monthly samples then show no exceedances, the sampling frequency will revert back to the frequency specified in the Integrated Monitoring Plan.

D. All ground water plumes that exceed ground water standards must continue to be monitored until the need for institutional controls is mitigated.

E. All ground water remedies, as well as some soil remedies, will require ground water performance monitoring. The amount, frequency, and location of any performance monitoring will be based on the type of remedy implemented and will be determined on a case-by-case basis within decision documents. The remedy should also consider that surface water quality will be acceptable for all uses after active remediation.

3.5 Ground Water Classifications

A. Three classifications currently apply to ground water at RFETS:

_ Domestic Use Quality;

_ Agricultural Use Quality; and

_ Surface Water Protection.

B. Because ground water use in all areas of the Site will be prevented, the domestic use and agricultural use classifications can be removed. Surface water protection standards for ground water are understood to be the applicable surface water standards.

4.0 SUBSURFACE SOIL

4.1 Basis for Action Levels

Subsurface soil is defined as soils deeper than six inches below the ground surface. Action levels for subsurface soil are protective of:

_ human exposure appropriate for the land uses delineated on Figure 1;

_ surface water standards via ground water transport; and

_ ecological resources.

4.2 Action Levels

The subsurface soil action levels have been calculated using a two-tier approach.

A. Tier I

1. All subsurface soils capable of leaching contaminants to ground water at concentrations greater than or equal to 100 x MCLs. Where a MCL for a particular contaminant is lacking, the residential ground water ingestion-based PPRG value will apply.

2. Contaminant-specific Tier I action levels for volatile organic contaminants have been determined using a soil/water partitioning equation and a dilution factor from EPA's Draft Soil Screening Guidance (1994). These derived values and the parameters used to derive them are listed in Table 4 of this document. The subsurface media characteristics for these calculations are based on Site-Specific data or conservative values where representative RFETS values cannot be determined. Where subsurface characteristics in a particular area within RFETS differ significantly from those chosen as representative of the entire Site, those alternate values should be used. When refined parameters are agreed to by the parties, the derived values may need to be recalculated.

3. Table 4 also includes certain inorganic contaminants that may be of concern at RFETS. Contaminant-specific Tier I action levels for these targeted inorganic contaminants, including radionuclides, have not yet been included in Table 4, but are currently under development in a manner consistent with the action levels in 4.2.A.1 above. Table 4 will be updated to include these action levels as soon as they are developed.

B. Tier II

Additional subsurface soil may need to be remediated or managed to protect surface water quality via ground water transport or ecological resources. Subsurface soil presenting unacceptable ecological risks (hazard index [HI]∀1) identified using the approved methodology will be evaluated for remediation or management.

4.3 Action Determinations

A. Tier I

When contaminant levels in subsurface soil exceed Tier I action levels, subsurface soil source removals will be triggered. These removals will be accomplished through accelerated actions.

B. Tier II

When an action is necessary to protect surface water or ecological resources, a process to identify, evaluate, and implement efficient, cost-effective, and feasible remediation or management actions will be triggered. Actions will consider the following:

_ Actions will be developed in an integrated manner with other actions being taken;

_ Actions will be consistent with best management practices;

_ Actions may be accomplished by means of an interim or final action; and

_ Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.

C. Appropriate remedial or management actions will be determined through this evaluation process on a case-by-case basis, and may include the removal, treatment, disposal, or in-place stabilization of contaminated subsurface soils.

D. Single geographically isolated data points of subsurface soil contamination above the Tier I or Tier II action levels will be evaluated for potential source magnitude. These single points will not necessarily trigger a source removal, remedial, or management action, depending on the source evaluation.

5.0 SURFACE SOIL

5.1 Basis for Action Levels

Surface soil will be defined as the upper six inches of soil. Action levels for surface soil are protective of:

_ human exposure appropriate for the land uses delineated on Figure 1;

_ surface water quality via runoff; and

_ ecological resources.

5.2 Action Levels

The surface soil action levels have been calculated using a two-tier approach based on protection of appropriate human exposure.

A. Tier I

1. Action levels for non-radionuclides are human-health risk-based (carcinogenic risk equal to 10-4 and/or a HI of 1) for the appropriate land-use receptor. Table 5 presents the calculated action levels for these exposure scenarios:

a. Industrial Use Area (Area 1 on Figure 1): Action levels are based on Office Worker exposure as defined in the finalized PPRG document.

b. Restricted Open Space Area (Area 2 and 4 on Figure 1): Action levels are based on Open Space Recreational User exposure as defined in the finalized PPRG document.

2. Action levels for radionuclides will be the more conservative of:

a. Radiation dose limit of 15 mrem per year for the appropriate land use receptor, or

b. Human-health risk (carcinogenic risk equal to 10-4) to the appropriate land-use receptor as described in Section 5.2.A.1 above. The calculated values associated with these exposure scenarios are listed in Table 5.

c. The parties commit to expeditiously convene a working group to determine the derivation and application of the 15 mrem per year level as well as the derivation and potential application of the 75 mrem per year level.

B. Tier II

1. Action levels for radionuclides and non-radionuclides are human-health risk-based (carcinogenic risk of 10-6 and/or a HI of 1) for the appropriate land-use receptor. Table 5 presents the calculated action levels for these exposure scenarios:

a. Industrial Use Area (Area 1 on Figure 1): Action levels are based on Office Worker exposure as defined in the finalized PPRG document.

b. Restricted Open Space Area (Area 2 and 4 on Figure 1): Action levels are based on Open Space Recreational User exposure as defined in the finalized PPRG document.

2. Additional surface soil may need to be remediated or managed to protect surface water quality via runoff or ecological resources. The amount of soil and the protective remediation levels and/or management technique will be determined on a case-by-case basis. Surface soil presenting unacceptable ecological risks (a HI greater than or equal to 1) identified using the approved methodology will be evaluated for remediation or management.

5.3 Action Determinations

A. When contaminant levels in surface soil exceed Tier I action levels a process to identify, evaluate and implement efficient, cost-effective, and feasible remediation or management actions will be triggered. Appropriate remedial or management actions will be determined through this process on a case-by-case basis, and may include the removal, treatment, disposal, or in-place stabilization of contaminated surface soils.

B. When contaminant levels in surface soil exceed Tier II action levels, they will be managed. Management may include, but is not limited to, "hotspot" removal, capping, or designating land uses that preclude unacceptable exposure. In addition, if aggregate risks at any source area exceed 10-4, remedial action will be required. Actions will consider the following:

_ Actions will be developed in an integrated manner with other actions being taken;

_ Actions will be consistent with best management practices;

_ Actions may be accomplished by means of an interim or final action; and

_ Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.

Figure 1

Conceptual RFETS Land Uses Map

The Action Levels and Standards Framework Tables ARE NOT Currently Available Electronically

These are pages 5-23 to 5-41 of Attachment 5 of the RFCA.

Please visit a Rocky Flats Reading Room for a hard copy of these tables.

Summary table 1

TABLE 3

Tier II Ground Water Monitoring Wells

for Volatile Organic Compounds

Location Code

6586

75992

06091

10194

1986

P314289

P313589

7086

10992

1786

1386

10692

4087

B206989

New well (upstream of 6586)

New well (between ponds B-2 and B-3)

New well (downgradient of Ryan's Pit near pond C-1)

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